

Section III. Remarks

Amendment of the Specification

In response to the examiner's objection to paragraph [0025] at line 2 thereof for failing to include a degree symbol in the temperature recitals, paragraph [0025] has been replaced by a new correspondingly numbered paragraph in which the degree symbol has been set forth in each temperature recital.

In addition to the foregoing, the specification has been amended to correct typographical and grammatical errors, in paragraphs [0004], [0005], [0008], [0009], [0042], [0047] and [0048].

No new matter has been introduced (35 U.S.C. §132).

Amendment of the Claims

In response to the examiner's objection to claims 1, 3, 5 and 8 in the August 11, 2004 Office Action, claims 1, 3, 5 and 8 have been amended to correct the spelling of "polytetrafluoroethylene" therein.

In addition, the same misspellings in claims 9 and 14 have been corrected.

In claim 10, a misplaced comma has been corrected and the temperature has been identified as being Centigrade by insertion of "C" followed by the inserted recital "for a sufficient time" to reflect the temporal duration involved.

Claim 16 has been amended to correct the spelling of "contacting" and to recite the PTFE material as being "in the form of a film."

Claim 18 has been amended to recite that the film is "incorporated in" a package.

Addition of Claims 19 and 20

Claims 19 and 20 have been added to further encompass the invention.

Claim 19 recites a method of determining time and temperature conditions for heat processing of PTFE films, as described in paragraph [0010] of the application.

Claim 20 has been added to claim a PTFE film having the features described in paragraphs [0009] and [0030] of the application.

Fee Payable for Addition of New Claims 19 and 20

The addition of new claims 19 and 20 herein does not increase the total number of claims beyond the number for which payment previously was made, but does increase the number of independent claims by two.

Accordingly, an added claims fee of \$176.00 is payable. A Credit Card Authorization Form in such an amount is enclosed, in payment of the added claims fee.

Authorization hereby is given to charge any further fee or amount that may be properly payable in connection with the filing and entry of this Amendment, to Deposit Account No. 08-3284 of Intellectual Property/Technology Law.

Rejection of Claims on Reference Grounds, and Traversal Thereof

In the August 11, 2004 Office Action, claims 1-18 were rejected under 35 U.S.C. §102(b) as anticipated by Bergman, et al. U.S. Patent 5,377,708 ("Bergman").

The rejection is traversed.

Remarks concerning the patentability of amended claims 1-18 are set out in the ensuing section.

Patentable Distinction of Claims 1-18 over Bergman

The PTFE heat treating method and resultant article of the invention resolve a significant problem – particle shedding – resulting from the usage of PTFE in applications such as the containment and dispensing of liquids stored in and dispensed from liners formed of PTFE film material.

The inherent deficiency of PTFE involving particle shedding is discussed at pages 1-2 in paragraph [0006] of the application.

The heat treatment method of the invention has been found to minimize the incidence and extent of particle shedding, with particle count reductions of fifteen to almost sixty times those of untreated PTFE, based on the exemplary particle count values set out in paragraph [0048] of the application.

The particle shedding problem is one that heretofore has not been appreciated by the art, and the art has not contemplated any methodology or approach to resolving such deficiency.

Concerning the citation of Bergman as the basis for §102(b) rejection of claims 1-18, it is to be noted that for anticipation to exist, a reference "must teach every aspect of the claimed invention either explicitly or implicitly. Any feature not directly taught must be inherently present." (MPEP §706.02, Rejection on Prior Art [R-1]). The prior art is anticipatory only if every element of the claimed invention is disclosed in a single item of prior art in the form literally defined in the claim (*Jamesbury Corp. v. Litton Indus. Products*, 756 F.2d 1556, 225 USPQ 253 (Fed. Cir. 1985); *Atlas Powder Co. v. Du Pont*, 750 F.2d 1569, 224 USPQ 409 (Fed. Cir. 1984); and *American Hospital Supply v. Travenol Labs*, 745 F.2d 1 223, USPQ 577 (Fed. Cir. 1984)).

Considered against these criteria, Bergman is seen to lack disclosure of heat treatment of PTFE involving "heating for a time sufficient to substantially reduce a particle count character of the polytetrafluoroethylene material," as recited in claim 1.

Bergman discloses a heating process that is used to volatilize reaction by-products that can form under some conditions on semiconductor wafers (see Bergman, Abstract, lines 16-19).

See column 1, lines 55-58 of Bergman:

"One of the disadvantages of immersion etching processes is that the wafers typically exhibit an increase in the numbers of particulates which become adhered to or imbedded in the wafer."

These particulates are further described in column 3, lines 49-68 of Bergman:

"The inventor hereof has discovered that vapor processing of semiconductor wafers, substrates and similar units using the novel processing described herein can result in the formation or undesirable particulate in some types of processing. The particulate has been manifested in localized deposits, or alternatively, in relatively diffuse layers generally deposited over the entire treated surface of the wafer. In some cases the particulate will be sufficiently concentrated to form a visible haze. In other cases the particulate will only be observable using magnifying instrumentation.

The exact nature of the particulate or particulates which form on the surface of the wafer is not known with certainty. However, it is believed to be one or more fluorosilicates formed by competing side reactions to the removal of silicon oxides by hydrofluoric acid. One possible fluorosilicate which may be formed is H_2SiF_6 , hydrogen hexafluorosilicate. Others compounds or solid phase mixtures may also be present or the primary particulate being formed."

Thus, Bergman teaches that the particulates localized on or in the wafer are reaction products of hydrofluoric acid and silicon oxides, and that the particulate problem is associated with vapor etching of wafers using HF.

To remedy this problem, Bergman teaches the use of a heat volatilization step or steps to remove condensed fluorosilicates or other particles produced as by-products by the vapor etching process (column 10, lines 52-55 of Bergman). Specifically, Bergman heats the wafer (in a heated chamber or by exposure to infrared radiation) to volatilize the etching by-products.

The examiner has noted that Bergman teaches an apparatus in which various components may be formed of PTFE, and on such basis asserts that Bergman discloses applicant's invention.

In response, it is pointed out that Bergman discloses a particle problem deriving from chemical reaction in the vapor-phase etching of silicon wafers, and the resulting condensed fluorosilicates do not in any way equate, extrapolate or analogize to particles shed from PTFE.

Particles shed from PTFE are PTFE particles. This is self-evident. It is correspondingly clear that PTFE particles are not equal or equivalent to, or in any way suggestive of, fluorosilicate particles.

Additionally, Bergman in no way teaches that there is any particle shedding deficiency associated with PTFE components used in his wafer processing system.

Further, the heating process disclosed in Bergman, while apparently well-suited to volatilizing etching reaction product particles, is wholly inadequate for treating a PTFE material to "substantially reduce a particle count character" thereof, as required by applicant's claim 1. See Bergman at column 11, lines 9-12, teaching that:

"[T]he heating steps will usually be preformed for periods in the approximate range of 30 seconds to 5 minutes, more preferably 30 seconds to 2 minutes."

See also Bergman at column 11, lines 20-22, teaching that:

"[T]he wafers being processed are typically heated to temperatures in the range of 100°-300°C. during the volatilization processing."

The teaching in Bergman of heating time in a range of 30 second to 5 minutes should be contrasted with the heating duration required in the practice of applicant's claimed invention. As described at page 6, in paragraph [00031] of the instant specification,

"a recommended time period is greater than about 20 hours, a more preferred time period is greater than 50 hours, and a most preferred time period is about 100 hours."

It therefore is apparent that the step of "heating for a time sufficient to substantially reduce a particle count character of the polytetrafluoroethylene material" in applicant's claimed invention, as involving suitable heating durations of ~20 to ~100 hours to achieve such character, is greatly

disproportionate to the 30 seconds to 5 minutes taught by Bergman for volatilizing the vapor etching chemical reaction product particles.

For example, the preferred heating time of 30 seconds to 2 minutes taught by Bergman is 3,000 to 12,000 times longer than preferred heating times in the practice of applicant's claimed invention.

Since there is a difference of 3 to 4 orders of magnitude between the heating durations involved in Bergman's wafer treatment process and heating times "sufficient to substantially reduce a particle count character of the polytetrafluoroethylene material" in applicant's claimed invention, it follows that Bergman in no way teaches, suggests or is capable of achieving the result produced by applicant's claimed invention.

In the context of §102(b), it is apparent that Bergman does not in any way anticipate or lead one of skill in the art in the direction of applicant's claimed invention. Contrariwise, Bergman teaches away from applicant's claimed invention, by instructing the use of extremely short heating periods that are grossly deficient for achieving the substantial reduction in particle count character that is obtained in applicant's claimed invention.

The meaning of "teaching away" is clear and well-established in the applicable law. A reference "may be said to teach away when a person of ordinary skill, upon reading the reference,...would be led in a direction divergent from the path that was taken by the applicant." *Tec Air, Inc. v. Denso Mfg. Mich, Inc.* 192 F.3d 1353, 1360, 52 USPQ 2d 1294, 1298 (Fed. Cir.1999).

Since Bergman motivates only extremely brief elevated temperature exposures to volatilized chemical reaction by-product fluorosilicate particles on or in wafers (which are wholly different from, and non-analogous to, PTFE particles shed from PTFE films), there is no basis or reason in

such reference for the skilled artisan to spontaneously adopt totally different (3-4 orders of magnitude higher) heating times than those taught by the reference in order to improve a material property that (1) is not even contemplated by the reference as being problematic, and (2) cannot in fact be improved by the brief elevated temperature exposure conditions taught by Bergman.

For such reasons, claim 1, and claims 2-9 depending directly or indirectly therefrom, are patentably distinguished over Bergman and in form for allowance.

Corresponding distinction is applicable to claim 10, which has been amended herein to recite heating of PTFE material to about 228°C for a "sufficient time to substantially reduce a particle count character thereof." No such "sufficient time" is derivable, expressly, impliedly, or in any other manner, from Bergman. Accordingly, claim 10, as well as claim 11 dependent thereunder (reciting heating "for about 100 hours") are patentably distinguished over Bergman.

Claim 12 also is patentably differentiated over Bergman. Claim 12 recites a PTFE material having a particle count character reduced by application of an elevated temperature thereto.

As already pointed out, the extremely short elevated temperature exposures taught by Bergman to be satisfactory for volatilization of vapor etching chemical reaction by-products is grossly inadequate for achieving a particle count character reduction of a PTFE material.

Bergman therefore provides no derivative basis for applicant's claimed PTFE material as recited in claim 12, and claim 12 is correspondingly patentable, as are claims 13-18 variously dependent thereunder.

In sum, all claims 1-18 patentably distinguish over Bergman and merit allowance. Added claims 19 and 20 also patentably distinguish over Bergman. Favorable action by the examiner is correspondingly requested¹.

CONCLUSION

The pending claims 1-20 of the application are now in form and condition for allowance. If any issues remain outstanding, the examiner is requested to contact the undersigned attorney at (919) 419-9350 to discuss their resolution, in order that this application may be passed to issue at an early date.

Respectfully submitted,



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¹ it being noted that the remaining references cited in the Office Action (Derbyshire, Johnson, et al. and Reiling) are acknowledged by the examiner at pages 5-6 of the Office Action as not disclosing applicant's claimed invention.